ERICSSON

Y-Splitter Guidelines

Radio Dot System

User Guide

11/1553-FGB 101 0308/1 Uen D2B

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Contents

1 Introduction

This document describes the Y-splitter that is used in the Radio Dot System (RDS). It also details deployment options, recommendations for installation, and how to install the Y-splitter.

The Y-splitter is an adapter that provides the sharing of the Radio Dot Interface (RDI) feeder cable.

Two Y-splitters are used with the following single band Radio Dot configurations:

— RD 2242

— RD 2243

— RD 2253

One Y-splitter is used with the following dual band Radio Dot configurations:

— RD 4442

— RD 4453

The Y-splitter enables the connection of Radio Dots to an RDI feeder cable as follows:

— Two RD 2242s can connect to the same RDI feeder cable.

— Two RD 2243s can connect to the same RDI feeder cable.

— Two RD 2253s can connect to the same RDI feeder cable.

— Both sides of an RD 4442 can connect to a single RDI feeder cable.

— Both sides of an RD 4453 can connect to a single RDI feeder cable.

Note: Different types of Radio Dots cannot be connected to a single IRU.

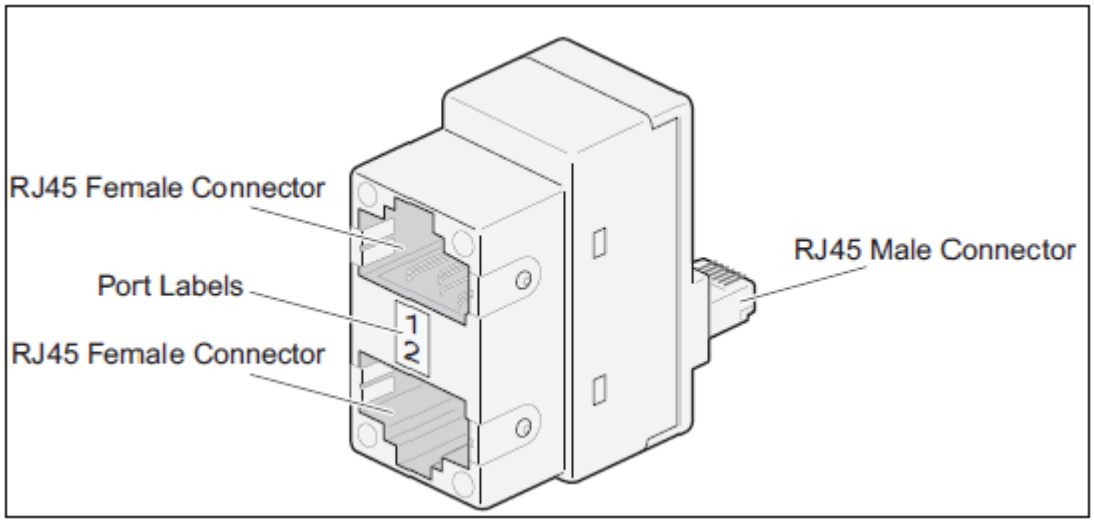


Figure 1 Y-Splitter Example

For product ordering information, refer to *RDS Site Products Overview*, 5/1551-FGB 101 0308/1.

1.1 Radio Dot Interface (RDI) Cable

The Radio Dot Interface (RDI) is the cabling between the IRU and the Radio Dots. It is composed of the Patch cable + Feeder cable + Jumper cable.

For information on the certifying testing and the maximum length, refer to the RDI Cabling Guidelines, 15/1553-FGB 101 0308/1.

2 Y-Splitter Overview

The purpose of the Y-splitter is to enable the connection of two single band Radio Dots (RD 2242, RD 2243, or RD 2253) to the same RDI feeder cable. It is also used to enable the connection of the two sides of a dual band Radio Dot (RD 4442 or RD 4453) to a single RDI feeder cable.

The pinout of the Y-Splitter is shown below. This applies to the usage of two single band Radio Dots or a dual band Radio Dot.

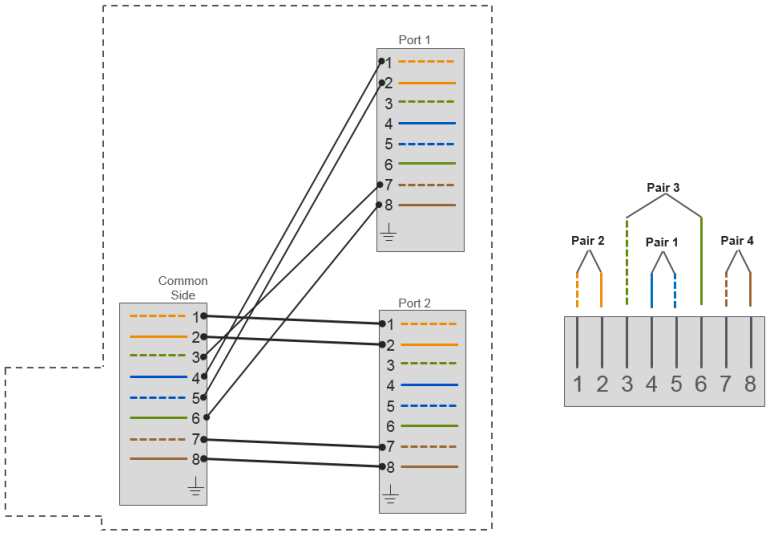


Figure 2 Y-Splitter Pinout

A basic Y-splitter configuration for single band Radio Dots (RD 2242, RD 2243, and RD 2253) is shown in the following figure:

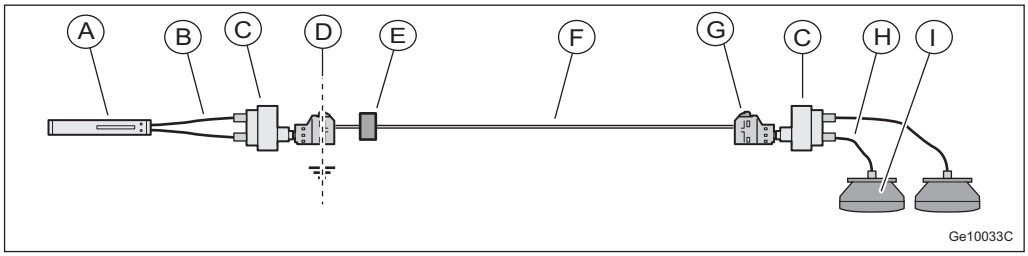


Figure 3 Basic Y-Splitter Configuration (RD 2242, RD 2243, RD 2253)

Table 1 Y-Splitter Configuration Components (RD 2242, RD 2243, RD 2253)

Position	Component
A	IRU

Position	Component
B	RDI Patch Cable
C	Y-Splitter
D	RJ45 Female Connector (Patch Panel)
E	Ferrite
F	RDI Feeder Cable
G	RJ45 Female Connector (Connection Box)
H	RDI Jumper Cable
I	Radio Dot

A basic Y-splitter configuration for dual band Radio Dots (RD 4442 and 4453) is shown in the following figure:

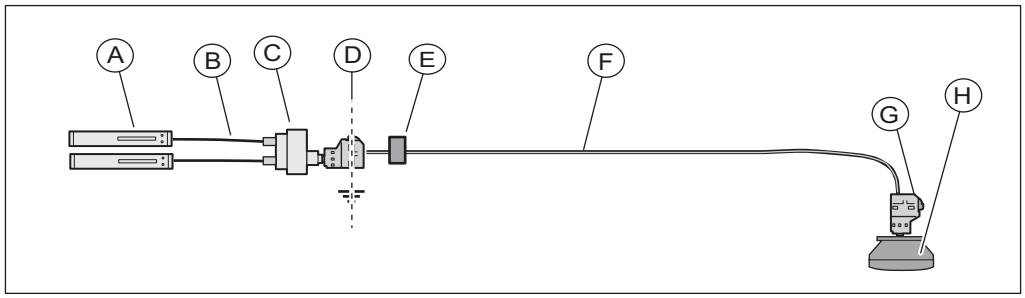


Figure 4 Basic Y-Splitter Configuration (RD 4442, RD 4453)

Table 2 Y-Splitter Configuration Components (RD 4442, RD 4453)

Position	Component
A	IRU
B	RDI Patch Cable
C	Y-Splitter
D	RJ45 Female Connector (Patch Panel)
E	Ferrite
F	RDI Feeder Cable
G	RJ45 Male Connector
H	Radio Dot

2.1 Y-Splitter Requirements

Y-splitter deployment configurations require the following:

— Installed cables must meet the generic RDI cable requirements listed in *RDI Cabling Guidelines*, 15/1553-FGB 101 0308/1.

— Shielded and Screened Twisted Pair (TP) cables are mandatory. The following types of TP cables can be used:

  • S/FTP

  • F/FTP

  • U/FTP

— The total cable length of any Y-splitter deployment configuration, including both shared and dedicated cable paths, must comply with RDI parameters.

— To meet FCC Class B regulations, a snap-on ferrite must be installed on the feeder cable in the patch panel between the female connector and the cable tie.

— The following table represents the minimum carrier bandwidth that can be configured for each Radio Dot type:

Table 3 Minimum Carrier Bandwidth per Radio Dot Type

Radio Dot Type	Minimum Carrier Bandwidth
RD 2242	10 MHz
RD 2243	5 MHz
RD 2253	5 MHz
RD 4442	5 MHz
RD 4453	5 MHz

Note: If an RD 2242 is co-located on the same Y-Splitter along with any other Radio Dot type, a minimum of 10 MHz for the carrier must then be configured.

For Y-Splitter configurations using single band Radio Dots:

— The IRU cannot connect to an RD 2243 or RD 2253 and an RD 2242 at the same time. The software performs a compatibility check and generates a configuration mismatch alarm if the capabilities of the Radio Dots are not the same.

For Y-Splitter configurations using dual band Radio Dots:

— The patch panel must be grounded as per the manufacturer's guidelines.

— The IRU cannot connect to an RD 4442 or RD 4453 and an RD 2242 at the same time. The software performs a compatibility check and generates a configuration mismatch alarm if the capabilities of the Radio Dots are not the same.

- The IRU can connect to an RD 2243 B1, B3, B7, B25, B40A, or B66A and the same band side of an RD 4442.
- The IRU can connect to an RD 2243 B1 or B3 and the same band side of an RD 4453.
- The two sides of an RD 4442 or RD 4453 cannot connect to the same IRU.
- The two sides of an RD 4442 or RD 4453 cannot be connected to the same port number of two separate IRUs.
- The RDI jumper cables from the two IRUs to the Y-splitter must be the same length.
- Each bands are assigned to a specific port on the Y-splitter. See the Y-splitter Band and Port Assignment table for port assignments.

Note: The B40A/B3 dual band Radio Dot is only certified for the China market.

3 Y-Splitter Deployment Options

The Y-splitter is used in the following IRU deployment configurations:

- Single IRU: Two Radio Dots (RD 2242, RD 2243, or RD 2253) on the same IRU sharing one RDI feeder cable. See Deployment Configurations (Single Band Radio Dots) on page 7.
- Dual IRU: Two Radio Dots (RD 2242, RD 2243, or RD 2253) on different IRUs sharing one RDI feeder cable. See Deployment Configurations (Single Band Radio Dots) on page 7.
- Dual IRU: One Dual Band Radio Dot (RD 4442 or RD 4453) on different IRUs sharing one RDI feeder cable. See Deployment Configurations (Dual Band Radio Dots) on page 9.

3.1 Deployment Configurations (Single Band Radio Dots)

The deployment configurations in this section are only applicable to the following single band Radio Dots: RD 2242, RD 2243, and RD 2253.

Attention!

Before installing the Radio Dot using the standard ceiling mounting brackets, verify that the structural integrity of the tile material can support the unit weight (388 g for RD 2243 or 381 g for RD 2253) plus the weight of the mounting bracket (46 g for short socket or 100 g for tall socket).

The Y-splitter deployment configurations with single band Radio Dots are shown in the following figure:

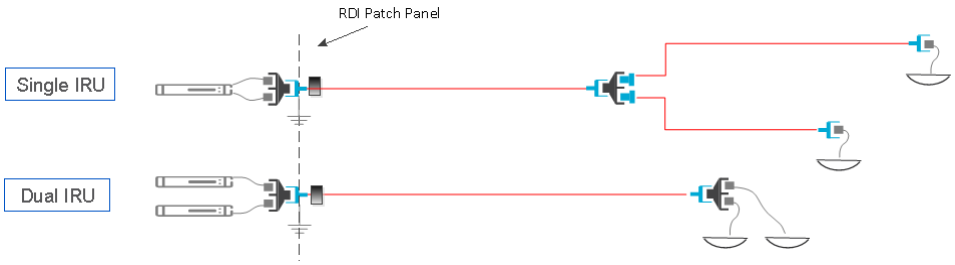


Figure 5 Deployment Configurations with Single Band Radio Dots

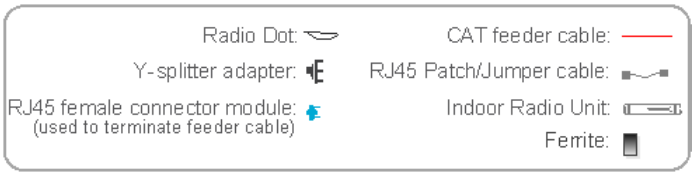


Figure 6 Legend

Note: This legend is applicable to all of the deployment configuration examples shown in this section.

The RDI link is comprised of the following components:

— Patch Cable: IRU to Patch Panel

— Feeder Cable: Patch Panel (with ferrite on the RDI cable on the feed side) to Connection Box.

— Jumper Cable: Connection Box to Radio Dot.

The RDI link components are shown in the following figure:

Figure 7 RDI Link

The Y-splitter adapter supports the following deployment options:

— Sharing of complete end-to-end link

— Sharing of common cable route

— Daisy chaining (cascading)

3.1.1 Sharing of Complete End-to-End Link

Note: This section is only applicable to RD 2242, and RD 2243, and RD 2253 deployments.

The sharing of a complete end-to-end RDI Link is valid for co-located dual IRU deployments with Y-splitters at IRU and Radio Dot end points of CAT cable. This is also valid for deployments with 4x4 MIMO on co-located or distributed Radio Dots.

Figure 8 Co-located Dual IRU

3.1.2 Sharing of Common Cable Route

Note: This section is only applicable to RD 2242 and RD 2243, and RD 2253 deployments.

The sharing of a common RDI cable route is valid for single or dual IRU non co-located deployments where the Radio Dots are not co-located. Y-splitters are required for common cable routes, such as the vertical riser to Intermediate Distribution Frame (IDF), with floor level fan-outs per Radio Dot.

Figure 9 Single IRU Non Co-located

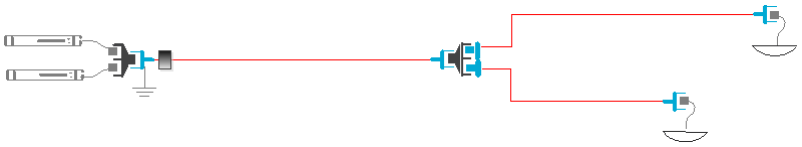


Figure 10 Dual IRU Non Co-located

3.1.3 Daisy Chaining

Note: This section is only applicable to RD 2242 and RD 2243 and RD 2253 deployments.

Daisy chaining (cascading) is valid for single or dual IRU deployments. It requires cable routing between Radio Dot positions: Y-splitters at the IRU and first Radio Dot, with cable routed to the cascaded Radio Dot.

Figure 11 Single IRU Daisy Chaining

Figure 12 Dual IRU Daisy Chaining

3.2 Deployment Configurations (Dual Band Radio Dots)

The deployment configurations in this section are only applicable to the following dual band Radio Dots: RD 4442 and RD 4453.

Attention!

Before installing the Radio Dot using the standard ceiling mounting brackets, verify that the structural integrity of the tile material can support the unit weight (424 g for RD 4442 or 422 g for RD 4453) plus the weight of the mounting bracket (46 grams for short socket or 100 grams for tall socket).

The RD 4442 and RD 4453 can be deployed in different ways depending on the need of deploying multiple bands, hosting multi-operators, or using cascaded configuration to reduce the number of CPRI links.

Note: All deployments using the RD 4442 or RD 4453 involve using the Y-splitter between the IRU and the Radio Dot, regardless if the patch panel is used or not.

The following table defines which Y-splitter port is used for a specific band.

Table 4 Y-Splitter Band and Port Assignment Table

Dual Band Option	Port 1	Port 2
B1/B3	B3	B1
B1/B7	B7	B1
B3/B7	B7	B3
B25/B66A	B66A	B25
B30/B30	B30	B30
B40A/B3	B3	B40A
B48/B48	B48	B48

Deploying the RD 4442 or RD 4453 with a single Digital Unit (DU) or Baseband unit helps reduce the footprint within the RBS allowing for more cabinet landscape availability.

Deploying the RD 4442 or RD 4453 with different DUs or Baseband units for each band renders a multi-operator scenario feasible if these operators use different bands (Band 1 and Band 3 or Band 7).

The cascaded option reduces the number of ports used on the DU or Baseband unit allowing for more radios to be served by that DU or Baseband unit. Also, a reduction in CPRI links is gained by this scenario. In this case, the CPRI link between the DU or Baseband and the first IRU must be capable of enough bandwidth to carry both the CPRI data of the first and cascaded IRU.

The LTE B1 and B3 or B7 deployment uses one of the following for digital unit:

— DUS 31/41

— IDU 5205/5209 LTE FDD

— Baseband 5212/5216 LTE FDD

— Baseband 6620/6630

The Mixed Mode WCDMA B1 and LTE B3 or B7 topologies use one of the following for digital unit of each technology:

— DUS 31/41

— IDU 5205/5209 LTE FDD

— Baseband 5212/5216 LTE FDD

— DUW 11/41/31

— Baseband 5212/5216 WCDMA

— Baseband 6620/6630

3.2.1 Deployment Scenarios (Dual Band Radio Dots)

This section provides deployment scenarios that are only applicable to RD 4442 and RD 4453. The following scenarios are examples only and do not reflect all band options.

Note: B40A/B3 Dual Band Radio Dot is only certified for the China market.

The Band 7 option in these deployments is applicable only to RD 4442.

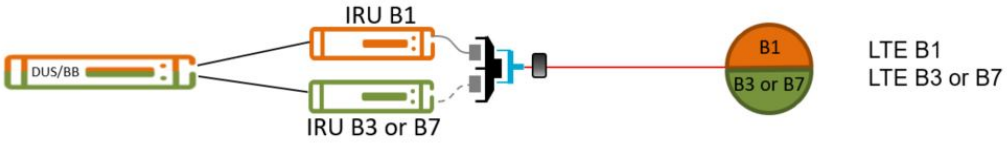


Figure 13 Single Mixed Mode DU/BB

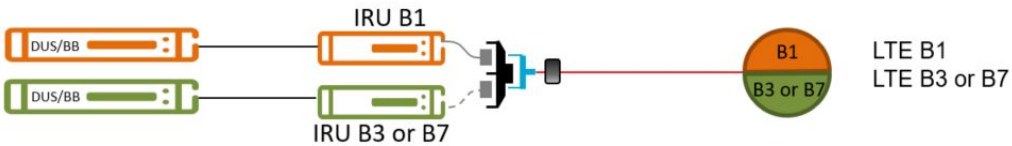


Figure 14 Multi-Operator Capable

In the Multi-Operator configuration, operator 1 can be substituted for Band 1 and Operator 2 can be substituted for Band 3 or 7.

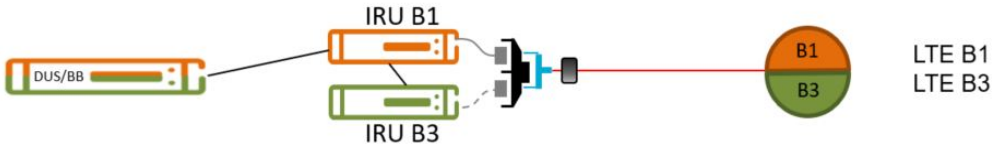


Figure 15 Cascaded Configuration

The following deployment scenarios address Dual Band and Mixed Mode.

Note: The Band 7 option in these deployments is applicable only to RD 4442.

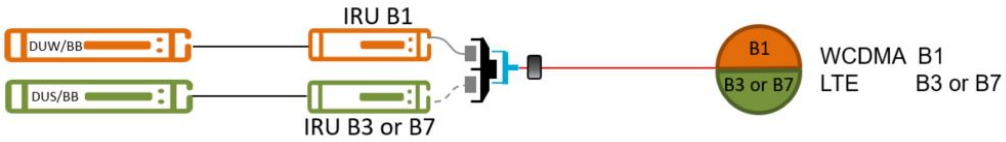


Figure 16 Mixed Mode, Multi-Operator Capable

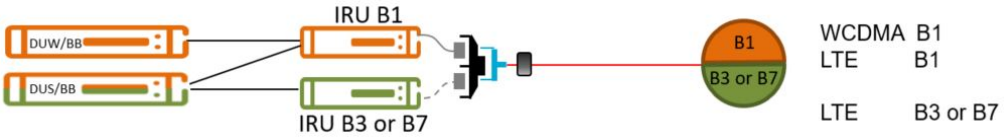


Figure 17 Mixed Mode, Multi-Carrier

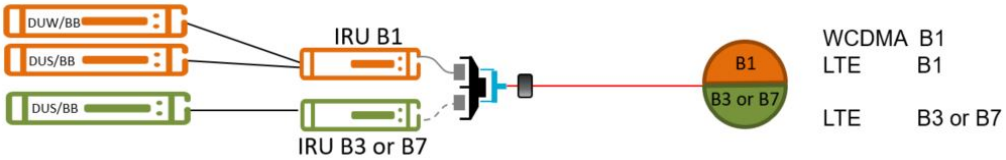


Figure 18 Mixed Mode, Multi-Carrier, Multi-Operator Capable

Figure 19 Mixed Mode, Multi-Carrier, Cascaded Configuration

4 Y-Splitter Installation

This section provides guidelines on how to install the Y-splitter and other related site products.

4.1 Connect Y-Splitter (Where Applicable)

This section describes how to install the Y-splitter for RDI sharing.

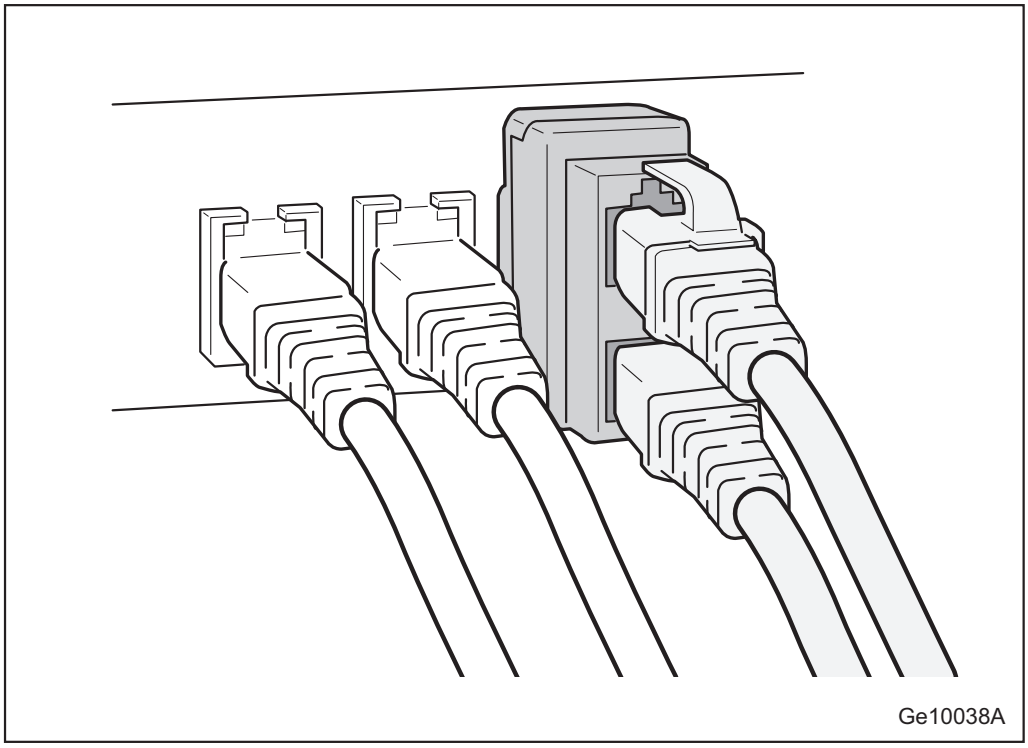


Figure 20 Y-Splitter Attached to a Patch Panel

Before installing the Y-splitter, refer to Y-Splitter Requirements on page 4 for information on RDI cable requirements.

To install the Y-splitter, do the following:

Steps

1. Connect the RDI jumper cables to the Y-splitter.

   For recommendations on RD jumper cabling for single or dual IRU configurations with Y-splitter, refer to Radio Dot Jumper Cabling for Y-Splitter Configurations on page 14.

2. Connect the Y-splitter to the RJ45 female connector on the RDI feeder cable.

   To provide mechanical support, install the RDI feeder cable in a connection box near the .

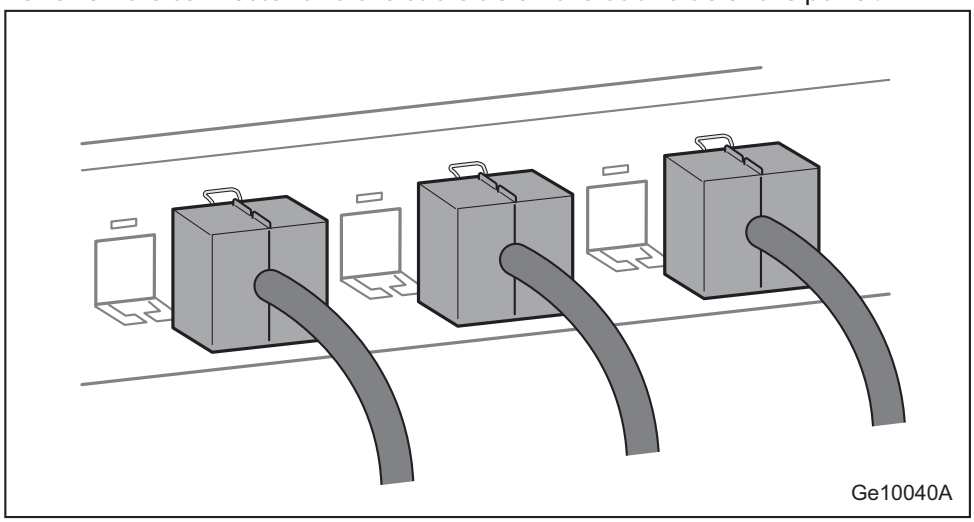
3. Connect the RDI patch cables to the Y-splitter.

   For recommendations on patch cabling for single or dual IRU configurations with Y-splitter, refer to IRU Patch Cabling for Y-Splitter Configurations on page 17.

4. Connect the Y-splitter to the RJ45 female connector on the RDI feeder cable.

   To provide mechanical support, install the RDI feeder cable in a patch panel near the IRU.

5. Install a snap-on ferrite on the feeder cable in the patch panel, between the RJ45 female connector and the cable tie on the back side of the panel.



4.2 Radio Dot Jumper Cabling for Y-Splitter Configurations

This section provides recommendations for Radio Dot jumper cabling for single or dual IRU configurations using the Y-splitter.

For single IRU configurations, the following recommendations apply:

— The choice of port number on the Y-splitter governs whether the Radio Dot is odd or even-numbered in maintenance actions.

— Devices connected to Y-splitter port number 1 are odd-numbered in maintenance operations, since odd-numbered IRU ports are plugged into Y-splitter port number 1 on the other end.

— The actual device number of the Radio Dot depends on the feeder to which it is attached. For example, if IRU port number 1 and port number 2 share a feeder, the connected Radio Dots are device number 1 and 2, and so on.

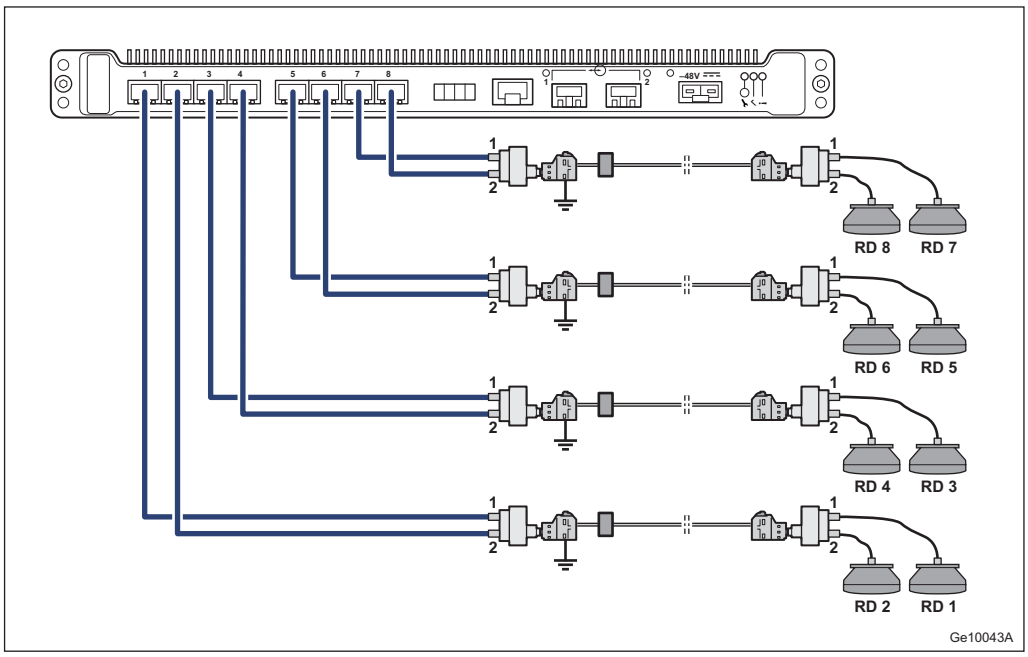


Figure 21 Radio Dot Jumper Cabling in Single IRU Configurations (RD 2242, RD 2243, RD 2253)

For dual IRU configurations, the following recommendations apply:

— Connect the Radio Dot jumper cables from all Radio Dots of the same IRU to the same Y-splitter port number (1 or 2).

— The Radio Dot numbering for maintenance actions corresponds to the IRU port number which is connected to the same Y-splitter port.

  For example, if an Radio Dot is connected to Y-splitter port number 1 and Y-splitter port number 1 is connected to IRU port 5 on the IRU end, then the Radio Dot is unit number 5 in maintenance actions.

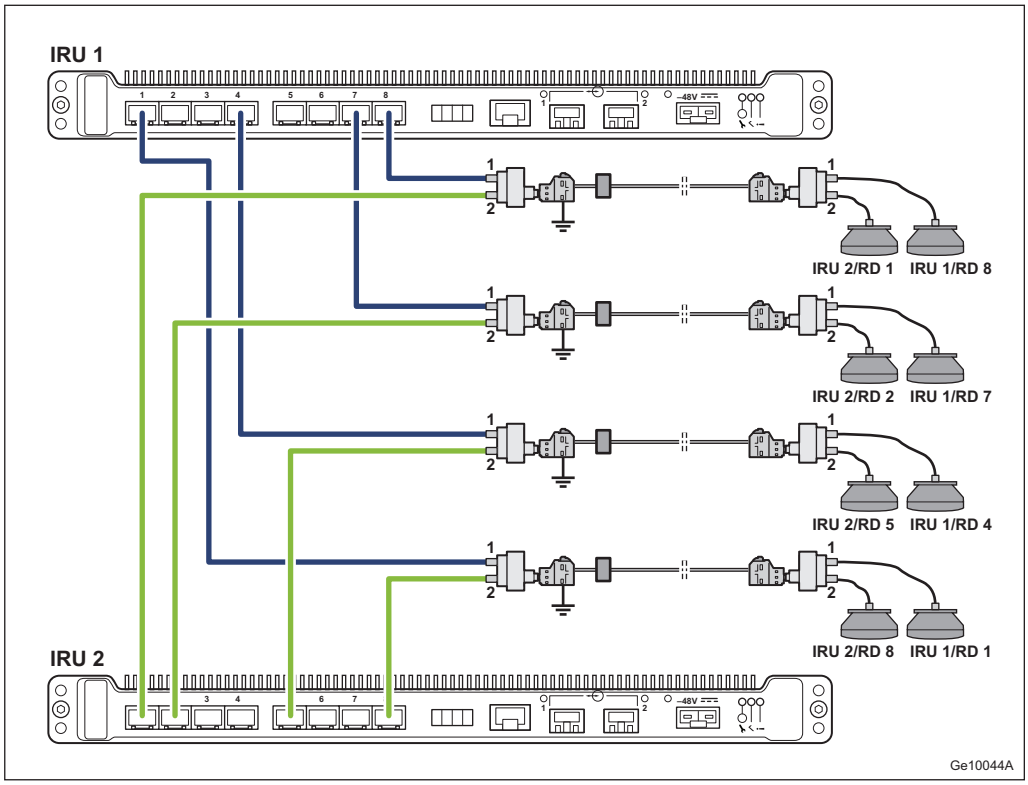


Figure 22 Radio Dot Jumper Cabling in Dual IRU Configurations (RD 2242, RD 2243, RD 2253)

The configuration shown in Figure 22 is also valid for deployments with 4x4 MIMO on co-located or distributed Radio Dots. In these deployments, IRU1/RD1 and IRU2/RD8 can be a pair of co-located or distributed RDs.

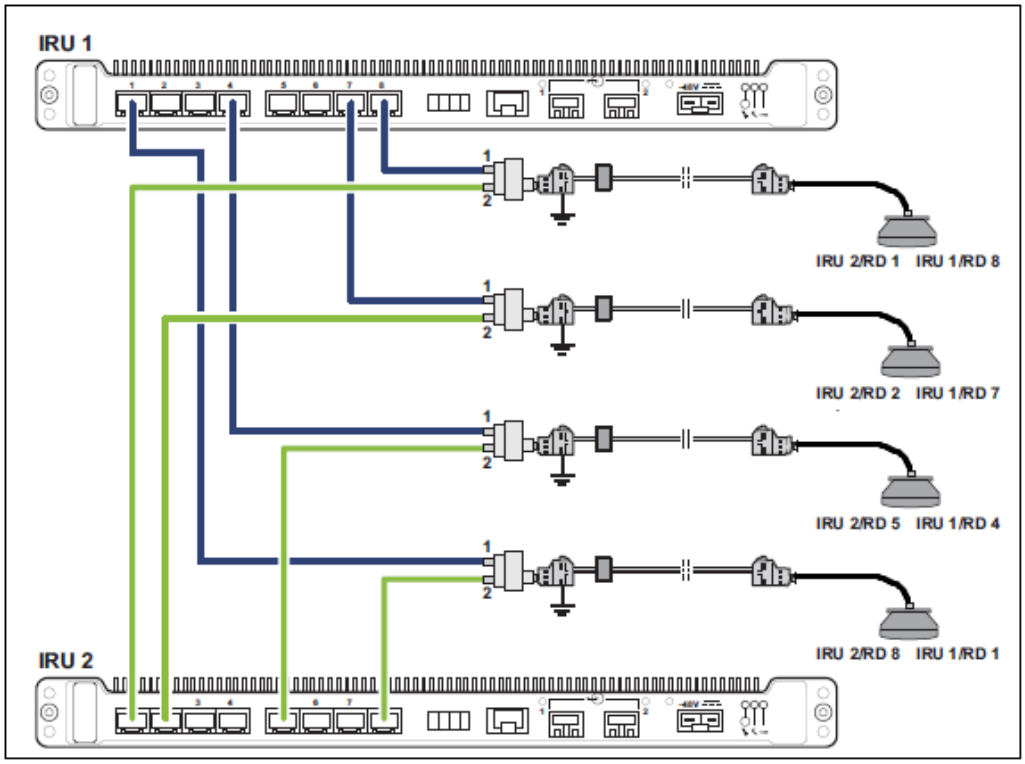


Figure 23 Radio Dot Jumper Cabling in Dual IRU Configurations (RD 4442, RD 4453)

4.3 IRU Patch Cabling for Y-Splitter Configurations

This section provides recommendations for IRU patch cabling for single or dual IRU configurations using the Y-splitter.

For single IRU configurations, the following recommendations apply:

— It is recommended that the IRU ports are sequentially connected.

— Connect odd-numbered ports to port number 1 on the Y-splitter and even-numbered ports to port number 2 on the Y-splitter.

Note: It is possible to mix runs connected to Y-splitters using shared cables with unshared runs, on the same IRU.

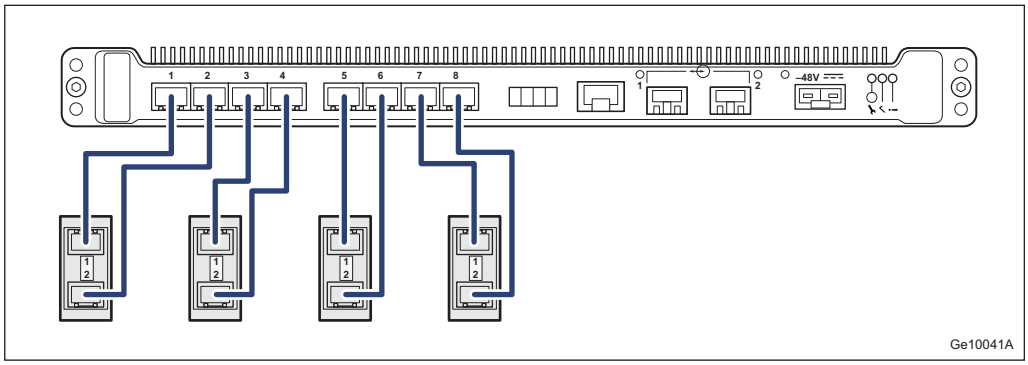


Figure 24 IRU Patch Cabling in Single IRU Configurations (RD 2242, RD 2243, RD 2253)

For dual IRU configurations, the following recommendations apply:

— To prevent cross talk, IRU ports with the same port number cannot share a cable.

— Patch cables from the same port number can not share cables. Reverse the order so that, for example, IRU-1 ports 1-8 share Y-splitter cable with IRU-2 ports 8-1.

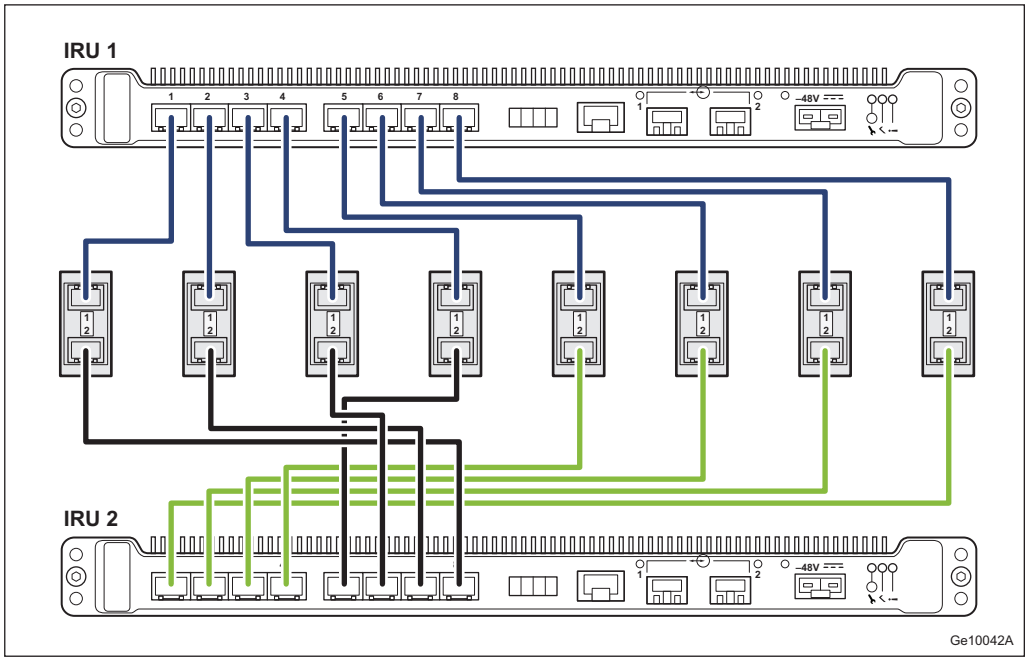


Figure 25 IRU Patch Cabling in Dual IRU Configurations (RD 2242, RD 2243, RD 2253, RD 4442, RD 4453)